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Cytotoxic potentials of thiocyanate administration on the liver of male wistar rats (RattusNorvegicus)

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Abstract

The use of thiocyanate as an anti-sickling drug is currently on the increase among sickle cell disease (SCD) patients. The continuous use of this substance without sufficient toxicity data does not guaranty continuously functional and healthy internal organs among the SCD patients that are susceptible to multi-organ failure such as hepatic failure. Hence this study was performed to elucidate the consequence(s)of thiocyanate administration on the liver of adult male wistar rats.

Twenty adult male wistar rats with an average weight of 234.5g were used. The rats were grouped into four (A, B, C & D) with five animals in each group. Group A represented the control and was given only 1ml of distilled water daily while B,C,&D received 1ml of thiocyanate solution at doses of 10mg/Kg/day, 20mg/Kg/day, & 30mg/Kg/day for twenty-eight (28) days. The administration was carefully done with the use of an oral cannula. Thereafter, the rats were sacrificed via cervical dislocation. The rats were dissected and blood samples were immediately collected from the apex of the heart for the analysis of serum total bilirubin. A fraction of the liver was cut to prepare homogenates for biochemical enzymes (alanine aminotransferase-ALT, aspartate aminotransferase- AST) analysis. Thereafter the animals were wholly perfused with normal saline and then fixed with 4% paraformaldehyde. The fixed liver tissues were then taken for histological assessments. The slide sections (H&E and PAS stains) in the treated groups showed varying degrees (mild to severe disruption of hepatocellular morphology plus prominence and widening of sinusoids) of thiocyanateinduced liver damage. But hepatocellular appearance was normal in the control group. Biochemical assays of serum total bilirubin and tissue AST increased fairly with increasing dose although this was not significant. The increase in tissue level of ALT in group B was also not significant with respect to the control. But increase in ALT level was found to be significant in groups C&D when compared with the control. Therefore, this study can be used to infer that SCN use in sickle cell disease management regimen can cause hepatocellular damage in wistar rats.

Key Words: Thiocyanate,Biochemical enzymes,Hepatocellular morphology, Anti-sickling

Full Text: